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The Tactical Center of Gravity:  
Fact or Fallacy?

A Monograph  
by

Major Patrick M. Strain  
United States Marine Corps

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Fort Leavenworth, Kansas

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## ABSTRACT

THE TACTICAL CENTER OF GRAVITY: FACT OR FALLACY? by Major Patrick M. Strain, USMC, 48 pages.

In 1986, the US Army published a revision of FM 100-5, Operations, that, for the first time, clearly linked military theory and its doctrine. In this manual, a term defined by Carl von Clausewitz as the hub of all power and movement, the center of gravity, is introduced and defined as a key to operational design and applicable to all levels of war.

This study examined the applicability of Clausewitz's center of gravity at the tactical level of war. A complementary concept, the decisive point, as defined by Baron Antoine Henri Jomini, was also examined and a linkage established to the center of gravity. Joint doctrine as well as the doctrine of other military services and the former Soviet Union were reviewed to determine the validity of the concept outside the Army. Two tactical level operations, the 1st Marine Division in OPERATION CHROMITE, the landing at Inchon, Korea and the subsequent capture of Seoul, and the 24th Infantry Division (Mechanized) during OPERATION DESERT STORM, were examined to determine the utility of a tactical center of gravity.

A center of gravity is a source of strength for the enemy force and is normally attacked indirectly through decisive points. It is decisive points that are attacked by tactical commanders as part of the operational commander's plan to destroy or neutralize the enemy's center of gravity. The conclusion of this study is that Clausewitz never intended his analogy of center of gravity to be used at the tactical level of war.

This study recommends that FM 100-5, as well as Joint and Sister Service doctrine, be revised to restrict the use of center of gravity to the strategic and operational levels of war and further develop the inherent relationship between center of gravity and the decisive point.

## Table of Contents

<b>Abstract.....</b>	<b>iii</b>
<b>Section I</b>	
<b>Introduction .....</b>	<b>1</b>
<b>Section II</b>	
<b>Understanding Clausewitz's Center of Gravity.....</b>	<b>5</b>
<b>Section III</b>	
<b>Understanding Jomini's Decisive Point.....</b>	<b>12</b>
<b>Section IV</b>	
<b>FM 100-5, The Center of Gravity, and the Decisive Point...19</b>	
<b>Section V</b>	
<b>Related Applications of Center of Gravity.....24</b>	
<b>Section VI</b>	
<b>A Historical Perspective.....30</b>	
<b>Section VII</b>	
<b>Conclusions.....38</b>	
<b>Endnotes.....</b>	<b>41</b>
<b>Bibliography.....</b>	<b>46</b>

## SECTION I: INTRODUCTION

Theory cannot equip the mind with formulas for solving problems, nor can it mark the narrow path on which the sole solution is supposed to lie by planting a hedge of principles on either side. But it can give the mind insight into the great mass of phenomena and of their relationships, then leave it free to rise into the higher realms of action.

Carl von Clausewitz<sup>1</sup>

In 1986, the US Army's FM 100-5, Operations, introduced the US Army audience to selected elements of the theoretical foundation on which its doctrine was developed. Among these concepts was Carl von Clausewitz's analogy of center of gravity. FM 100-5 described center of gravity as a key element of operational design and that it exists at the strategic, operational, and tactical level of war.<sup>2</sup> To remain a valid concept, the definition of center of gravity in doctrinal manuals must be consistent with Clausewitz's intent and the present day realities of the modern battlefield. It then will possess the importance Clausewitz attached to it, stating that "the ultimate substance of enemy strength must be traced back to the fewest sources, and ideally to one."<sup>3</sup> A thorough understanding of Clausewitz shows he did not ascribe a center of gravity to the tactical level and its use in this context in US Army doctrine is inconsistent with his intent.

Why is the study of center of gravity so important? While it is not the primary task of theory to generate doctrine or rules, today's doctrine must contain a theoretical underpinning to retain its viability on a rapidly changing battlefield. A proper understanding of theoretical concepts enables sound doctrinal

development and execution. When terms advanced by theorists are introduced into doctrine, it is absolutely critical that a common, accepted understanding of the term exists. Clausewitz's varied definitions of center of gravity in Books IV, VI, and VIII of On War must be reconciled and a common meaning and application developed.

Clausewitz used center of gravity in several different contexts in On War. His diverse use of this notion and its subsequent analysis, application, and misapplication at all levels of war by nations and military forces around the world have resulted in a confusing, and often contradicting, understanding of his intent. The most common argument for a center of gravity at the tactical level is that it must be the enemy force. Yet, Clausewitz never states nor implies that it must always be the enemy force; in reality he offers examples of centers of gravity that are not the enemy's force.

The validity of a center of gravity at the tactical level of war will be determined by reviewing Clausewitz's writings in On War to ascertain not only his intent but its applicability to the modern battlefield. Theory must be timeless and comprehensive, encompassing all aspects of the subject. It is imperative that theory be grounded in constants, avoiding temporary phenomenon that only serve to distort reality and render the theory valid for just a short period of time. The center of gravity, to be useful, must transcend the limiting peculiarities of the era in which it was conceived.

Following the discussion of Clausewitz and center of gravity, a complementary concept advanced by Baron Antoine Henri Jomini in his Summary of the Art of War, the decisive point, is reviewed. Although attributed to Jomini, Clausewitz also addressed it. It is a concept that has gained acceptance in doctrine and will be a part of the 1993 revision of FM 100-5. The utility of the decisive point is its linkage to the enemy's center of gravity--a strength--giving the tactical commander a focus of effort to indirectly attack the enemy through vulnerable points as part of the overall operational commander's campaign design. Thus, center of gravity and decisive point have a symbiotic relationship; analyzing one without the other would reveal only part of the entire issue.

Once center of gravity and decisive point are defined and placed in perspective, it is necessary to review the use of these terms in the doctrine of the US Army, other services, and the military forces of other countries. In an increasingly complex world of intertwined economies and political relationships, joint and combined operations are more prevalent, resulting in the need for a common understanding of theory and doctrine. The arbitrary use of terms can and will cause confusion and excessive casualties on the battlefield.

Two historical examples--the landing at Inchon, Korea in September 1950, and the ground war during Operation Desert Storm in February 1991--are used to determine if a center of gravity exists at the tactical level of war. Analysis of these events will answer the following questions:

--What were the centers of gravity at the operational level?  
--Is a center of gravity identifiable at the tactical level?  
--What were the decisive points and how were they connected to the center of gravity?

Following the analysis, conclusions are offered on the viability of the tactical center of gravity.

At the outset, it is important to define terms that are used throughout this study: strategic, operational, and tactical level of war. The strategic level of war is that "at which a nation or group of nations determines national or alliance security objectives and develops and uses national resources to accomplish those objectives."<sup>4</sup> The operational level of war is that level "at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy."<sup>5</sup> The tactical level of war is the level where "battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces."<sup>6</sup>

The publication of Carl von Clausewitz's On War in 1832 was a monumental step towards the establishment of a credible theory of war with a timeless quality. It continues to be what many consider the most comprehensive work on the art of war ever published. Michael Howard concluded that "[i]t remains the measure of his genius that, although the age for which he wrote is long since past, he can still provide so many insights relevant to a generation, the nature of whose problems he could not possibly have foreseen."<sup>7</sup>

## SECTION II: UNDERSTANDING CLAUSEWITZ'S CENTER OF GRAVITY

Military theory is not a general body of knowledge to be discovered and elaborated, but is comprised of changing conceptual frameworks which are developed in response to varying challenges, and which always involve interpretation reflecting particular human perspectives, attitudes and emphases.

Azar Gat<sup>8</sup>

Center of gravity derives from the German word *Schwerpunkt* as used in Clausewitz's *On War*. The term comes from the German words *schwer*, meaning heavy, and *der punkt*, meaning point or spot.<sup>9</sup> The many interpretations of this term are often confusing, ranging from the literal interpretation of center of gravity in physics to the figurative understanding of emphasis or focal point. The current German use of *Schwerpunkt* is the "point of main effort."<sup>10</sup>

The varied interpretations of *Schwerpunkt* and its subsequent applications in military doctrine have confused an otherwise valuable concept. Clausewitz used the analogy of a center of gravity (*Schwerpunkt*) to designate the enemy's strength; a strength that can rarely be directly attacked. To fully understand his intent, the reader must not become mired in the literal meanings of *Schwerpunkt*, but must understand his overall intent. Clausewitz emphatically tells his readers "that here, as elsewhere, our definitions are aimed only at the centers of certain concepts; we neither wish nor can give them sharp outlines."<sup>11</sup> Today's military must look beyond the literal interpretation of the word and gain a better understanding of its applicability to the modern battlefield.

Center of gravity is used in several different books of On War, each time in a different manner. A more complete understanding of the intent of this analogy in war is gained from the description of the term in Chapter 4 of Book VIII.

What the theorist has to say is this: one must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed.<sup>12</sup>

Clausewitz expands his definition of center of gravity through examples.

For Alexander, Gustavus Adolphus, Charles XII, and Ferdinand the Great, the center of gravity was their army. If the army had been destroyed, they would have gone down in history as failures. In countries subject to domestic strife, the center of gravity is generally the capital. In small countries that rely on large ones, it is usually the army of the protector. Among alliances, it lies in the community of interest, and in popular uprisings it is the personalities of the leaders and public opinion.<sup>13</sup>

The definition of center of gravity found in Book VIII is meaningful for several reasons. First, this definition clearly indicates that Clausewitz viewed center of gravity as applicable only at the strategic and operational levels of war. Second, this definition identifies areas other than the opposing force's army as potential centers of gravity. This is particularly germane as many students of military theory postulate that the center of gravity must always be the enemy's combat force. Third, if the present day use of center of gravity is to remain consistent with Clausewitz's use of the term and his analogies, then we must view the center of gravity as an enemy strength instead of a vulnerability.

While this definition of center of gravity is the most useful and often used, we must look further in On War to gain a fuller appreciation of this analogy. Book VI contains the discussion of center of gravity that is used by those who argue that it must always be the armed forces of the enemy. It is in this argument that the question of the validity of a center of gravity at the tactical level of war rests.

In Book VI, Clausewitz focuses his readers on the analogy of the center of gravity. "A center of gravity is always found where the mass is concentrated most densely. It presents the most effective target for a blow[.]"<sup>14</sup> From here he tells the reader that this concept holds true for war and enters into a discussion of unity and cohesion, necessary elements of a center of gravity and gives, as an example, the unity and cohesion that can be found in a single fighting force. He further states that the "effect produced in a center of gravity is determined and limited by the cohesion of the parts."<sup>15</sup>

It is during this discussion that Clausewitz states the "center of gravity will be found wherever the forces are most concentrated."<sup>16</sup> Dr. James Schneider, Professor of Military Theory at the School of Advanced Military Studies, has written that the center of gravity is the greatest concentration of the enemy's combat force.<sup>17</sup> It is his contention that the enemy's military force is always the center of gravity in combat. If the enemy force is always the center of gravity, then it can be successfully argued that it does exist at the tactical level of war and the discussion

of the subject should end. But Clausewitz did not limit the center of gravity to the enemy force. He tells us that the destruction of the enemy's armed forces was only "the object of war in the abstract" and that it was rarely attained in practice.<sup>18</sup> He goes on to describe center of gravity in terms other than the enemy's armed force.

Taking this argument a step further, Clausewitz identified the center of gravity as properly belonging in Book VIII, *War Plans*.

The last book will describe how this idea of a center of gravity in the enemy's force operates throughout the plan of war. In fact that is where the matter properly belongs; we have merely drawn on it here in order not to leave a gap in the present argument.<sup>19</sup>

This statement is critical in that it immediately brings the reader back to the "hub of all power and movement, on which everything depends."

A different reference to center of gravity is found in Book IV. In this passage, Clausewitz calls the battle the true center of gravity of war.<sup>20</sup> This is the first time the reader encounters this term and its focus is on the actual conflict in war. Clausewitz believed that "combat is the only effective force in war; its aim is to destroy the enemy's forces as a means to a further end."<sup>21</sup> He focuses on the battle as he knew it during his time. Battles were decisive, the course of the battle realized the exhaustion of resources and that the reserves were committed in the same day. These battles often determined the outcome of the war. "The major battle is therefore to be regarded as concentrated war, as the center of gravity of the entire conflict or campaign."<sup>22</sup> Because

the battle was decisive, the use of this analogy is not inconsistent with Clausewitz's definition of center of gravity in Book VIII.

Today, however, we encounter the "empty battlefield".<sup>23</sup> No longer are the forces concentrated on the battlefield as in the days of Napoleon. Major battles are rarely decisive and individual tactical successes do not guarantee victory in war. Today, the results of a major battle are seldom sufficient to secure a strategic objective, but instead are part of a larger whole that seeks to achieve a decisive aim. At the tactical level of war, events are much more compressed. The tactical commander does not have the depth of activities present at the strategic or operational level of war. He is given well-defined missions and objectives and expected to produce results quickly. Actions at the tactical level, although many and varied, do not of themselves alter the unity and cohesion of the enemy. Tactics are better suited to the attainment of decisive points and key terrain which rapidly change.

It is through the orchestration of tactical events at the operational level that the enemy's unity and cohesion are impacted and the source of the enemy's strength becomes vulnerable to disruption and destruction, ultimately leading to his defeat. At the strategic level, the proper integration of a nation's elements of power--military, economic, diplomatic, and informational--affects the unity and cohesion of an enemy nation. It is only at the strategic and operational levels of war that the unity and cohesion, the center of gravity, of a belligerent nation or force can be identified, targeted, and destroyed or neutralized.

Why should Book VIII be the cornerstone in defining center of gravity? How do we reconcile the different uses of this analogy throughout the book? To gain a better understanding of the importance of this definition, the two notes found in the beginning of On War should be reviewed. Dr. Azar Gat, a lecturer in Political Science at Tel Aviv University, offers the possibility in his book, The Origins of Military Thought, that the note dated 1830 was actually written several months before the note dated in 1827.<sup>24</sup> The primary reason the second note was presumed to have been written in 1830 is Clausewitz's statement that only the first chapter of Book I is complete.

Yet there are several inconsistencies in this line of thought. First, the tone of the two notes is similar, both expressing concern over the progress made to date and appearing to be at the same stage of development. Next, the second note fails to address any of the key concepts offered in the first, particularly the identification of two types of war--absolute and limited--and the realization that "war is nothing but the continuation of policy with other means."<sup>25</sup> The linkage of war and political aims became the cornerstone of Clausewitz's theory, yet the second note never mentions it. Third, if the second note was in fact written in 1830, then one must assume that virtually no work was done on the manuscript for three years, although his wife, Marie, wrote that he worked extensively until the spring of 1830 when he was transferred.<sup>26</sup>

If the 1827 note is used as the final one, then the importance of Book VIII becomes clearer as it gives a better understanding of

Clausewitz's view of war and use of terms. He wrote that if the writing of Book VIII resulted in clearing his mind and really establishing the main features of war, he would then go back and make those features clear throughout the other six books.<sup>27</sup> His wife wrote the only revisions she found were parts of Book I and inserted them into the manuscript in the appropriate places.<sup>28</sup> Again, looking at Book VIII, it goes far beyond the sketch referred to in the second note and the rough draft described in the first note. These arguments give greater importance to the definition of center of gravity found in Book VIII, one that can be used as a benchmark.

The center of gravity is not an enemy weakness but a strength. As such it normally cannot be directly attacked by the operational commander. It is the attacking of the enemy's center of gravity through indirect means that most often results in victory while preserving combat power. Tactical forces should not seek to directly attack the strength of the enemy, but through careful synchronization of tactical actions by the operational commander, overwhelming combat power is applied to decisive points that are directly linked to the enemy's strength. As the strategic and operational commanders focus on the enemy's center of gravity and its destruction, they identify decisive points that must be attacked by tactical forces. Decisive points become the tactical focus in a campaign. With this thought in mind, we move to a discussion of the decisive point.

### SECTION III: UNDERSTANDING JOMINI'S DECISIVE POINT

[T]he function of theory is to structure past and present intellectually, to show how one thing is related to another, and keep the important and unimportant separate; to reach the irreducible elements of the phenomenon of war, and to discover the logical and dynamic links that bind them into comprehensible structures.

Peter Paret<sup>29</sup>

Baron Antoine Henri Jomini, a contemporary theorist of Carl von Clausewitz, was probably the most prolific and well-known military theorist during the nineteenth century. His works were widely read and followed, in part because it provided a certain prescriptive formula for the conduct of war. His most notable work, Summary of the Art of War, was, and still is, an important work in the development of a timeless theory of war.

In this book, Jomini insists that there is but one fundamental principle of all operations in war. He describes the principle in four maxims:

1. To throw by strategic movements the mass of an army, successively, upon decisive points of a theater of war, and also upon the communications of the enemy as much as possible without compromising one's own.
2. To maneuver to engage fractions of the hostile army with the bulk of one's forces.
3. On the battlefield, to throw the mass of the forces upon the decisive point, or upon that portion of the hostile line which it is of the first importance to overthrow.
4. To so arrange that these masses shall not only be thrown upon the decisive point, but that they shall engage at the proper times and with ample energy.<sup>30</sup>

Jomini answers his critics' charges that it is simple to recommend the placing of the preponderance of force at the decisive point by

noting that the significance of these maxims rests in properly identifying these points.

What then is a decisive point? Jomini elaborates in great detail this concept in the Summary of the Art of War. He begins his discussion by noting decisive points are important because they exert significant influence on the whole campaign or a single enterprise.<sup>31</sup> It is any objective that when seized, gives a force a distinct advantage over his opponent and will often decide the outcome of the operation. Jomini divides them into two categories--geographic and maneuver.

Geographic decisive points possess a lasting importance in the theater of war due to their permanence. Jomini provides as examples the junction of several valleys, the center of communications for a country, and all capitals. There is a permanent nature to these points and they are all oriented on terrain or fixed places.<sup>32</sup>

Maneuver decisive points are transient in that they are found on the battlefield and are relative to the disposition of forces on the field. Jomini lays down as a general principle that maneuver decisive points are the flanks of the enemy where a force could easily separate the enemy from his base of operations while protecting his own. He says that a decisive point on the field of battle is determined by:

1. Features on the ground.
2. Relation of the local features to the ultimate strategic aim.
3. Positions occupied by the respective forces.<sup>33</sup>

Realizing the complexities of the modern battlefield, Jomini's concept of the decisive point must be viewed through a modern lens to determine its relevance on the battlefield.

Dr. Schneider has written that three kinds of decisive points exist on the battlefield: physical, cybernetic, and moral.<sup>34</sup> Physical decisive points, according to Dr. Schneider, are those most clearly related to Jomini's decisive points. They include such features as key hills, bridges, towns, or formations; in essence anything tangible.<sup>35</sup> It is this type of decisive point that a tactical formation can most easily attack, secure, or defend during the course of battle.

A cybernetic decisive point is anything that sustains the command, control, communication and information processes of a unit and, when attacked, causes a deterioration in the enemy's ability to control his operations. This is more than a point on the ground, but a capability that can be attacked through such elements as boundaries, communication nodes, staffs, or the commander.<sup>36</sup> This idea greatly expands Jomini's explanations in Summary of the Art of War, but is in keeping with his intent. Cybernetic decisive points are more fluid on the battlefield, yet remain a viable objective for tactical formations. By attacking this vulnerable point with overwhelming combat power, a commander may destroy one of the spokes connected to the center of gravity.

The third type of decisive point described by Dr. Schneider is the moral decisive point. These points are those that sustain the morale of the force<sup>37</sup> and are often harder to find and engage. It

is difficult to differentiate the physical and cybernetic from the moral decisive point. A commander can expect that any attack against an enemy vulnerability by overwhelming force will adversely affect the morale of the enemy. Attacks against lines of communications, denying the enemy the opportunity or ability to resupply his forces can adversely affect the enemy's morale. A commander has difficulty identifying moral decisive points; however, by attacking the physical and cybernetic points, the enemy's morale will decline.

Although Clausewitz did not directly address the decisive point as a key concept, he acknowledges the existence of such a point. He believed the massing of combat power at a decisive point on the battlefield was a certain step to victory. He speaks of overwhelming forces at the decisive point as the first principle of strategy when he says "that as many troops as possible should be brought into the engagement at the decisive point...This is the first principle of strategy."<sup>38</sup> Absolute superiority on the battlefield is not necessary as long as "relative superiority is attained at the decisive point."<sup>39</sup>

Finally, Clausewitz complements Jomini's assertion that the key to the decisive point is its correct identification and then the application of superior numbers.

Relative superiority, that is, the skilful concentration of superior strength at the decisive point, is much more frequently based on the correct appraisal of this decisive point[.]<sup>40</sup>

Clausewitz's use of decisive points must be understood in its proper context. Strategy decided the time, place, and forces available for a fight--it set the conditions for the engagement to be fought. The objective of the engagement merely served the objective of the war. The immediate results of the engagement were far removed from the overall objective, yet contributed to it and affected the final outcome. By applying overwhelming force at the decisive point, he understood the use of force at the decisive point was a conduit through which the enemy's center of gravity, his strength and the strategic objective, could be attacked and conquered.

Success at decisive points results in indirectly attacking the enemy's center of gravity through the massing of overwhelming combat power against a vulnerability, gaining success against an enemy strength through indirect means. As a useful analogy, we can view the center of gravity as the hub of a wagon wheel, the "hub of all power," providing a connecting place for all the spokes to maintain a round, cohesive, functioning wheel that enables the wagon to move along the ground.

If the hub of the wheel is destroyed, then the wheel can no longer perform its function. Destroying the hub of the wheel through the direct application of force is often impossible or too costly. However, if the spokes of the wheel are destroyed, then the hub no longer provides a connecting point, a source of cohesion for the wheel, and it is no longer capable of turning and supporting the wagon's movement. They are easier to destroy. The removal of one

may not render the wheel useless; conversely it may be a waste of effort to destroy them all. If a few key spokes are destroyed, the hub cannot maintain the continuity of the wheel, the wheel is destroyed, and the wagon can no longer move. The spokes of the wheel serve as decisive points connected to the hub, or center of gravity.

Unlike centers of gravity, decisive points exist at all levels of war--strategic, operational, and tactical. An example of an operational decisive point might be the seizure of a key port facility or rail complex, destroying the enemy's ability to resupply its forces. At the tactical level of war, decisive points give the commander a point on which to focus his combat power in order to achieve success in the engagement, ultimately leading to achievement of the operational and strategic objectives. Examples include key terrain features, such as a hill, or command and control nodes.

The dynamics of the modern battlefield, the dispersion of forces in time and space, and the increased lethality of the battlefield, do not permit the tactical commander to mass his forces against an enemy strength. He must focus on achieving relative superiority at an enemy vulnerability, a decisive point, that will indirectly attack the enemy's center of gravity. Decisive points give the tactical commander a concrete objective on which to orient his forces to achieve the operational commander's objectives.

It is the proper synchronization of tactical forces by the operational commander that succeeds in attacking the enemy's center of gravity through the linkage of decisive points. Often, there are

more decisive points present than forces to attack them. It falls on the operational commander to determine which points will be attacked to ensure success. Clausewitz warns against the wasting of forces, against the application of more force than is necessary at any point. The improper application of force may result in the commander reaching his culminating point long before he has achieved his objectives. It is obvious, therefore, that Jomini and Clausewitz concur that the selection of the key decisive points is essential to success on the battlefield at all levels of war.

#### SECTION IV: FM 100-5, THE CENTER OF GRAVITY, AND THE DECISIVE POINT

Theory can never lead to complete understanding, which is an impossibility, but it can strengthen and refine judgement. It is not the primary task of theory to generate doctrine, rules, or laws of action.

Peter Paret<sup>41</sup>

While theory does not generate doctrine, rules, or laws of action, it can and must provide the foundation on which they rest. Theory provides the underpinning for doctrine, the framework around which the military weaves a solid tapestry of doctrine. Theory is the starting point for the generation of doctrine. That being the case, how has the US Army incorporated the theories of Clausewitz and Jomini into its keystone manual, FM 100-5?

Although the 1986 edition of FM 100-5 was the first to directly acknowledge the role of theory in the development of US Army doctrine, military theory has long had an influence on its development. Civil War leaders were schooled in the theory of Jomini and carried these ideas to the battlefield. The writings of J.F.C. Fuller and B.H. Liddell Hart and their criticisms of Clausewitz after the travesty of World War I had an affect on doctrine that continues today.

Hart introduced the world to the strategy of the "indirect approach", a concept that had tremendous impact on the conduct of operations by the Germans in World War II and closely resembles Jomini and Clausewitz's discussion of relative superiority at the decisive point. Fuller developed the principles of war that today--tempered by experience--are found in FM 100-5.

FM 100-5 has undergone numerous revisions, incorporating the experiences of previous wars and the concepts of future conflicts. Throughout each revision, the writers of this manual were influenced by the military theories in vogue at the time. In 1976 and again in 1984, Michael Howard and Peter Paret published one of the most comprehensive and widely read interpretations of Clausewitz's On War that sparked a renewed interest in the theory of war found in this timeless work. The 1986 edition of FM 100-5 is the first to specifically introduce Clausewitzian terms and incorporate them into the doctrine of the US Army.

Appendix B of the 1986 edition of FM 100-5, *Key Concepts of Operational Design*, introduces the Army to three new terms that are incorporated into its doctrine: Center of Gravity, Lines of Operation, and Culminating Points. The introduction of center of gravity in the everyday terminology of the Army has done much to create an awareness of the role of theory in doctrine and cause confusion in its application at the user level.

FM 100-5 identifies the center of gravity as "key to all operational design" and defines it as

those sources of strength or balance. It is that characteristic, capability, or locality from which the force derives its freedom of action, physical strength, or will to fight. Its attack is--or should be--the focus of all operations.<sup>42</sup>

The explanation of center of gravity goes into some depth, describing centers of gravity that can be found at the strategic, operational, and tactical levels of war.

A strategic center of gravity, according to FM 100-5,

may be a key economic resource or locality, the strategic transport capabilities by which a nation maintains its armies in the field, or a vital part of the homeland itself. But it may also be a wholly intangible thing.<sup>43</sup>

Operational centers of gravity are described as

a component of the field force--the mass of the enemy force, the boundary between two of its major combat formations, a vital command and control center, or perhaps its logistical base or lines of communication... But an operational center of gravity may also be more abstract--the cohesion among allied forces for example, or the mental and psychological balance of a key commander.<sup>44</sup>

These passages appear to mix examples of Clausewitz's center of gravity and Jomini's decisive point. While Clausewitz readily admits that centers of gravity may be other than the armed forces of the enemy, the examples shown above are more closely related to decisive points described by Jomini--objectives that are concrete and lead to the defeat of the enemy's center of gravity.

The description of the tactical centers of gravity has led many to misuse and misunderstand this Clausewitzian concept.

Tactical formations can and frequently will have centers of gravity--a key command post, for example, or a key piece of terrain on which the unit's operations are anchored. But the concept is more usually and usefully applied to larger forces at the operational level.<sup>45</sup>

At this point, the Army acknowledges that centers of gravity are normally found at levels above the tactical level of war, yet muddles the concept by trying to fit it into a level never intended by its author. The examples of tactical centers of gravity are, in reality, concrete objectives on which a tactical commander can focus his efforts--decisive points. Since there is no further discussion of centers of gravity at the tactical level, it leaves the reader

confused, resulting in a misapplication or rejection of this key concept.

A further shortcoming of FM 100-5 is the absence of a discussion of decisive points. By ignoring this key Jominian concept and incorporating it as part of centers of gravity, an important idea--centers of gravity are strength and are attacked indirectly through decisive points--is lost. There is no linkage between decisive points and centers of gravity and, therefore, the doctrine is incomplete.

The 1993 revision of FM 100-5 (Preliminary Draft), as the keystone doctrinal manual, has done much to correct the deficiencies of the 1986 version. The definition of center of gravity more closely parallels that of Clausewitz:

The center of gravity is the hub of all power and movement, on which everything else depends. As it goes, so go the capabilities of the opposing force.<sup>46</sup>

It cites several "traditional examples" of center of gravity that may exist: the mass of the enemy's forces, the enemy's command and control, public opinion, national will, and alliances. More importantly, the center of gravity is identified as an enemy strength that normally cannot be directly attacked and must be destroyed through attacks at the enemy's decisive points. For the first time, there is a direct linkage in a doctrinal manual between centers of gravity and decisive points.

The new manual continues its discussion of centers of gravity noting its complexity, the sometimes abstract form it can take and its overarching importance in campaign design. Its one flaw is the

discussion of center of gravity at the tactical level of war. The manual states that centers of gravity can be found at all three levels of war.<sup>47</sup> Unlike the 1986 manual, however, it gives no other explanation of what a center of gravity is at the tactical level. Instead of clearing the haze surrounding the 1986 description, the 1993 version only increases the fog engulfing the existence of a center of gravity at the tactical level, further frustrating anyone attempting to come to a better understanding of its utility. The opportunities for misuse and misunderstanding have increased. The discussion of the decisive point and its linkage to the center of gravity follows closely the writings of Jomini and Clausewitz, noting that "[d]ecisive points are not centers of gravity; they are the keys to getting at the center of gravity."<sup>48</sup> The examples used for decisive points are remarkably similar to those used as examples for the tactical center of gravity in the 1986 version of FM 100-5.

Center of gravity and decisive points are complementary concepts. Jomini's use of decisive points is oriented on places, fixed and relative. It is something against which a force can be applied and is usually a vulnerability of the enemy force. If there is no linkage between a decisive point and a center of gravity, then the decisive point doesn't exist. This relationship must be thoroughly explored and made clear in doctrinal manuals. Decisive points are only decisive in their relation to the center of gravity.

## SECTION V: RELATED APPLICATIONS OF CENTER OF GRAVITY

The center of gravity is the point in the organism of the opposing state--military, political, economic, territorial, or social--at which, if he be defeated, or should he lose effective control of it, his whole structure of national power and direction will collapse or be fatally weakened.

Roger Ashley Leonard<sup>49</sup>

A discussion of the use center of gravity by other agencies and countries must necessarily consider the varied interpretations of *Schwerpunkt*. It is the many interpretations and adaptations of this word that has led to the conclusion by many that a center of gravity does exist at the tactical level.

The current German interpretation of point of main effort is a different meaning of *Schwerpunkt* than originally used by Clausewitz. It is the shifting and focusing of forces and fires in order to apply overwhelming combat power at a particular point.<sup>50</sup> The ability to mass these forces is critical considering the expansion of the battlefield in space and time since the Napoleonic wars. However, a main effort does not equate to a center of gravity as described by Clausewitz. It is not the hub of all power and movement, but a method by which the commander ensures sufficient combat power exists at a particular point and time on a battlefield. A tactical commander uses a main effort to ensure success in his engagements, tactical actions which of themselves are not significant, but when weaved together as part of a campaign plan lead to the destruction of the enemy's center of gravity, usually through indirect means.

Joint US Doctrine

The passage of the Nichols-Goldwater Defense Reorganization Act in 1986 initiated a long series of activities that focused the attention of the military services on conducting joint operations. By necessity, joint operations mandate a common understanding and use of terminology and doctrine. Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms, does not define center of gravity. However, the Joint Chiefs of Staff (JCS), in an effort to standardize as many concepts as possible, offer a proposed definition of center of gravity in Joint Pub 3-0 (Test), Doctrine for Unified and Joint Operations.

That characteristic, capability, or locality from which a military force derives its freedom of action, physical strength, or will to fight. It exists at the strategic, operational, and tactical levels of war.<sup>51</sup>

This definition is the same that is currently used by the US Army in FM 100-5. Unlike FM 100-5, however, there are no descriptions of center of gravity in the manual nor are there any further explanations. Joint Pub 3-0 (Test) focuses on the strategic and operational levels of war and notes that the identification of the enemy's strategic center of gravity is a key element of operational design and a fundamental part of a theater campaign plan.<sup>52</sup> In the end, however, there is no discussion of what constitutes a center of gravity at any level of war other than the above definition.

Joint doctrine is developed, to a great extent, from the doctrine of the military services, further requiring a fuller understanding of theory and its relationship to doctrine.

#### USMC Doctrine

The Marine Corps uses a slightly different interpretation of *Schwerpunkt* than used by the Germans. In his Maneuver Warfare Handbook, William Lind describes *Schwerpunkt* as a "focus of effort" as opposed to the point of main effort. He does this to remove the possibility that it might be interpreted as a point on the ground instead of a concept of focusing combat power on the battlefield.<sup>53</sup> Fleet Marine Force Manual (FMFM) 1, Warfighting, describes the focus of effort as the effort most critical to success.<sup>54</sup> The focus of effort is applied to an enemy critical vulnerability and is usually designated by assigning it to a particular unit. Thus, in the absence of clear orders on a fluid battlefield, each subordinate commander knows the commander's intent and is able to support his main effort. This use of *Schwerpunkt* is not a center of gravity, but simply a designation of a main effort, much as the Germans have done.

The Marine Corps does not use center of gravity in its doctrinal manuals. FMFM 1 discusses a concept described as a "critical enemy vulnerability"<sup>55</sup> which is the point on which the commander focuses his effort. It describes a critical vulnerability as the one thing which, if destroyed, will most affect the enemy's ability to fight.<sup>56</sup> This definition appears to be in line with

Clausewitz's description of center of gravity, yet, when one looks to the footnote for a further explanation of critical vulnerability, conflicting information is found. The manual notes that a critical vulnerability is:

Sometimes known as the center of gravity [sic]. However, there is a danger in using this term...Clausewitz was advocating a climatic test of strength against strength... This approach is consistent with Clausewitz's historical perspective. But we have since come to prefer pitting strength against weakness. Applying the term to modern warfare, we must make it clear that by the enemy's center of gravity we do not mean a source of strength, but rather a critical vulnerability.<sup>57</sup>

The manual continues the discussion of critical vulnerability noting that when it is reduced to its simplest terms, it requires the commander to "strike our enemy where and when we can hurt him most."<sup>58</sup> FMFM 1 applies this concept equally to all levels of war--strategic, operational, and tactical--providing examples of each. At the strategic level, these examples are similar to Clausewitz's examples of a center of gravity found in Book VIII of On War. At the operational and tactical level, the examples closely resemble decisive points as described by Jomini, much like the 1986 edition of FM 100-5.

In the end, confusion is created through the mixing and misapplication of terms, the introduction of new terms that are service unique, and a strong misunderstanding of center of gravity as a vulnerability instead of a source of strength using the decisive point as a conduit through which it can be successfully attacked. The Marine Corps' use of theory as a basic structure for

doctrine has relied on flawed interpretations of essential words and phrases, and the structure is weakened.

#### USAF Doctrine

Air Force Manual (AFM) 1-1, uses the definitions of center of gravity found in Joint Pub 3-0 (Test), FM 100-5, and Book VIII of On War.<sup>59</sup> While the basic definitions are sound, the insistence of the existence of a tactical center of gravity in Joint Pub 3-0 (Test) and FM 100-5 are not in consonance with Book VIII of On War.

AFM 1-1 uses center of gravity in an operational and strategic environment only. Beyond the two definitions noting the existence of a tactical center of gravity, there is no further discussion of it at that level in the manual. The focus of Air Force doctrine is at the strategic and operational level, with little being said about the tactical level beyond its relationship to close air support of troops on the ground. All other considerations are at the operational and strategic level. The manual further states that

[t]o impose one nation's will on another, susceptible enemy centers of gravity should be attacked; and of course, one's own center of gravity should be protected...Since war has widened to include much more than armies in the field, contemporary use of the term includes the enemy's economy and industrial capability to wage war, will (governmental and popular), and alliances.<sup>60</sup>

Air Force doctrine, while maintaining a strategic and operational focus, uses center of gravity in the same manner as Clausewitz, noting that it encompasses much more than the opposing force, and that it belongs above the tactical level of war.

### Doctrine of the Former Soviet Union

Former Soviet military thought has been heavily influenced by both Clausewitz and Jomini. This influence is seen primarily in their emphasis on the concentration of overwhelming combat power at the decisive point, at both the tactical and operational level.

To attain victory over the enemy one must not dissipate his forces and means equally across the entire front, but the main efforts must be concentrated on the most important axis or sector and at the right time in order to form there the necessary superiority over the enemy in men and weapons. Use of this principle has played a deciding role in a majority of the battles and engagements for centuries.<sup>61</sup>

There is also a strong emphasis on orienting combat forces on the enemy's army without diverting attention to geographic features. The destruction of the enemy army is the focus of attention of the Soviet commander.<sup>62</sup> This focus is very much in line with the writings of Clausewitz and his emphasis on the destruction of the enemy force as the best means to achieve victory.

These doctrinal statements clearly point to the influence of Clausewitz and Jomini. The thrust of these principles, however, is the massing of overwhelming combat power, in the main effort, at the decisive point on the battlefield. There is no mention of the concept of a center of gravity; instead the focus is on the laws of war and of armed conflict, using principles and laws that can be objectively measured.

## SECTION VI: A HISTORICAL PERSPECTIVE

First, a historical example may simply be used as an explanation of an idea...Second, it may serve to show the application of an idea...Third, one can appeal to historical fact to support a statement...to prove a possibility of some phenomenon or effect...Fourth and last, the detailed presentation of a historical event, and the combination of several events, make it possible to deduce a doctrine: the proof is in the evidence itself.

Carl von Clausewitz<sup>63</sup>

The study of history provides a vehicle for the development of theory and a tool for determining its timeless qualities. Historical examples should not be considered prescriptive, providing key insights for the creation of iron-clad principles. Instead, it is descriptive, providing a platform from which to analyze, study, and understand the course of events and their relationship to today. Through the use of two examples, the 1st Marine Division in OPERATION CHROMITE, the landing at Inchon, Korea in 1950 and the subsequent capture of Seoul, and the 24th Infantry Division (Mechanized) in OPERATION DESERT STORM, we will illustrate the proper identification and utilization of centers of gravity and decisive points at the tactical level of war.

### OPERATION CHROMITE

On 25 June 1950, the North Korean People's Army (NKPA) crossed the 38th Parallel in pre-dawn darkness, beginning the invasion of South Korea. The attack shocked the world and soon brought the United States into what would be a bloody three year war.

Initially, the US and South Korean forces suffered defeat after defeat as they tried to stop the NKPA. By the time OPERATION CHROMITE began on 15 September 1950, the US Eighth Army was holding on to a small area around the port city of Pusan in a desperate fight to keep it open, receive reinforcements, and effect a breakout to destroy the enemy forces.

As early as the beginning of July, General Douglas MacArthur, Commander-in-Chief, Far East Command, began making plans for an amphibious operation to strike the enemy's center of communications at Seoul.<sup>64</sup> Plans were made to land the 1st Cavalry Division on 22 July but the operation was abandoned due to enemy advances in the south. A second time the invasion was planned for mid-September using the 2d Infantry Division and the 5th Marine Regiment, but again it was scrapped due to enemy successes.<sup>65</sup>

MacArthur believed the best way to destroy the enemy was by interdicting his lines of communication (LOCs). He understood that he did not have the forces necessary to directly attack the enemy forces, his center of gravity. This was a strength which had to be attacked indirectly, at a decisive point. "The history of war proves that nine out of ten times an army has been destroyed because its supply lines have been cut off...We shall land at Inchon and I shall crush them."<sup>66</sup> The NKPA was the enemy's center of gravity at the operational level. It was a strength that could not be directly attacked and destroyed by MacArthur's forces. The enemy's LOCs, the decisive points, were vulnerable and could be attacked, providing a mechanism to defeat the enemy's center of gravity indirectly.

The 1st Marine Division, as part of the I (US) Corps, was assigned the following missions:

- Seize the port of Inchon and capture a beachhead line.
- Advance rapidly and seize Kimpo airfield.
- Cross the Han River.
- Seize and occupy Seoul.
- Occupy blocking positions north, northeast, and east of Seoul.<sup>67</sup>

The Division consisted of the 1st, 5th, and 7th Marine Regiments (infantry), the 11th Marine Regiment (artillery), and Division troops. Because the 7th Marine Regiment would not be available until two days after the landing at Inchon, the 1st Marine Regiment, Korean Marine Corps, would serve as the Division's reserve.<sup>68</sup>

The tidal range around the landing beaches was severe and did not support the complete landing of combat forces at one time. Consequently, the landing would have to occur in two phases. In the first phase, 3rd Battalion, 5th Marine Regiment would seize the island of Wolmi-do, which overlooked and commanded the harbor entrances to Inchon. The landing would occur during morning high tide so the island would be secured before the main landing occurred during the evening high tide.<sup>69</sup>

The landing at Wolmi-do at 0633 on 15 September signified the beginning of OPERATION CHROMITE. By 0750, the island was secure. At 1732, the 1st Marine Regiment landed across Blue Beach while the remainder of the 5th Marine Regiment landed across Red Beach. At 0130, the final D-Day objective was secure.<sup>70</sup> By landing at Inchon,

MacArthur both surprised the NKPA and secured a port facility that could no longer supply the enemy forces as well as providing a staging base for the assault and seizure of Seoul.

The next objective was the airfield at Kimpo. This airfield was a critical link in MacArthur's plan. The airfield was 6000 feet long, 150 feet wide, with a 120,000 pound load capacity. Seizure of the airfield would broaden the capabilities of employing air power in the following phases of the attack on Seoul as well as providing a base for the air operations against the NKPA supply routes. The 5th Marines attacked the airport and by the morning of 18 September, had secured the field. Several hours later, the first planes began to land at Kimpo and provide support for the forces on the ground.<sup>71</sup>

While 5th Marines was attacking Kimpo, the 1st Marines began the march towards Seoul via Yongdungp'o. Here they met stiff enemy resistance from elements of the North Korean 18th Division. Heavy fighting ensued, but eventually the Marines prevailed and moved towards the Han River, preparing for the assault on Seoul. Within Seoul, approximately 20,000 enemy troops were making preparations for the defense of Seoul. The 18th Division, which had been preparing to move to Naktong, was retained in Seoul to defend and repulse the I Corps attempts to capture the city and secure their supply lines.<sup>72</sup>

On 20 September, the 5th Marines crossed the Han River and began the assault on Seoul. Eight days later, the city was secure with the 1st, 5th, and 7th Marines occupying positions to the north and east of Seoul, blocking the Seoul-Uijongbu-Ch'orwan highway, a

main supply route, and causing the enemy to retreat to the north towards Ch'orwan. The Marines continued to push north towards Uijongbu and Ch'orwan, destroying enemy forces enroute.<sup>73</sup>

The orientation of the 1st Marine Division was on the seizure of key terrain and facilities, permitting MacArthur to interdict the enemy's supply lines and destroy his forces. There was no "hub of all power and movement" at the tactical level the Division could attack, either directly or indirectly, that could destroy the enemy forces. As part of MacArthur's campaign plan, the assigned objectives were key in destroying the enemy's center of gravity. The successful capture of these areas by the 1st Marine Division, in conjunction with the movement of the 7th Infantry Division on its right flank, interdicted the enemy's LOCs and set the stage for the breakout of Eighth Army from the Pusan Perimeter.

Clearly these objectives were geographic decisive points. Their seizure gave MacArthur a decisive advantage over the enemy, setting the stage for the destruction of their center of gravity. They provided the 1st Marine Division Commander physical objectives on which to orient his forces and plan his attack. The capture of any single objective assigned to the Marines would not have been decisive, yet together they struck at the enemy vulnerability, a decisive point, from which MacArthur could begin the destruction of the enemy's operational center of gravity--his army.

### OPERATION DESERT STORM

Saddam Hussein, the Iraqi dictator, sent his army across the Iraq/Kuwait border on the morning of 2 August 1990. In less than three days, Hussein succeeded in overrunning the small country and poised his forces for an attack into the Saudi Arabian oil fields. World response was swift and an unprecedented coalition of forces was gathered to evict Hussein's forces from Kuwait and reestablish the legitimate government.

The 24th Infantry Division (ID) (Mechanized), as part of the XVIII Airborne Corps, was one of the first heavy American divisions in the Kuwaiti Theater of Operations. They arrived during October, 1990 to establish defensive positions to prevent Iraqi forces from attacking into Saudi Arabia.<sup>74</sup> When the decision was made to conduct offensive operations to eject Iraqi forces, the 24th ID began its preparations for the attack. The XVIII Airborne Corps conducted a supporting effort, designed secure the enemy lines of communication (LOC) and prevent the withdrawal of forces northward into Iraq as the main effort attacked to destroy the Republican Guard Forces Command in the theater of operations.<sup>75</sup> The Republican Guard was designated the operational center of gravity by the Commander-in-Chief, Central Command, the operational commander in the theater.<sup>76</sup>

As part of the XVIII Airborne Corps, and the only mechanized force in the Corps, the 24th ID's mission was to "conduct [the] Corps main attack in zone to block EUPHRATES RIVER VALLEY LOC (OBJ GOLD); continue [the] attack to the east to destroy Iraqi forces

vicinity JALIBAH AFB (OBJ ORANGE).<sup>77</sup> The Division consisted of their 1st and 2d Brigades, the 197th Brigade, division troops, the 212th Field Artillery Brigade, and the 36th Engineer Group.<sup>78</sup> The Division's attack was a race over land in their zone to Highway 8, swinging eastward along the highway towards Basra in southern Iraq. They were to establish blocking positions at the Rumaila oil fields to catch any retreating Iraqi mechanized forces moving north out of Kuwait.<sup>79</sup>

At 1500 on 24 February 1991, the Division attacked into Iraq pushing northward towards Highway 8 and the Tallil and Jalibah airfields. Tallil was important in that it not only provided an airfield for operations, but was the center of a ten mile square network of well-camouflaged bunkers full of weapons, ammunition, and other supplies that had been stocked specifically for provisioning the Iraqi forces in Kuwait.<sup>80</sup> The Jalibah airfield was also important, providing the capability for air support against friendly operations.

The 24th ID achieved success in its drive towards Highway 8, securing its objectives--the EUPHRATES RIVER VALLEY LOC, Tallil and Jalibah airfields--and destroying enemy forces in zone by 0330 on 28 February, three and a half days after crossing the line of departure. Establishing blocking positions west of the Rumaila oil field, the Division engaged retreating enemy forces trying to cross the Hawr al Hammar on 2 March, destroying 187 armored vehicles, 34 artillery pieces, over 400 wheeled vehicles, and 9 rocket launchers

from the Hammurabi Division.<sup>81</sup> This was the last combat action for the Division.

The 24th ID, as part of the coalition forces, was assigned objectives that permitted the destruction of the operational center of gravity--the Republican Guard Forces Command. By concentrating the Division's efforts on the enemy's LOCs, supplies, airfields, and escape routes the coalition commander was able to strip away key enemy capabilities that indirectly struck at the Republican Guard. The objectives were primarily geographic decisive points, providing the coalition commander a means through which he attacked the Republican Guard. There was no tactical center of gravity on which the 24th ID commander could focus his efforts. There were no forces or facilities he could attack that would destroy the enemy's source of strength. That source of enemy strength resided at the operational level and could only be attacked through the coordinated efforts of all forces in the coalition.

## SECTION VII: CONCLUSIONS

Theory must be comprehensive, that is, it must be able to accommodate all aspects of its subject, whether of the present or of other times. It must be based on the constants or absolutes of its subject, not on phenomenon that may be temporary...Napoleonic warfare is a temporary phenomenon. Examples of absolutes are the social and political nature of war, and the psychology of the commander. Absolutes serve as the organizing principles of theory.

Peter Paret<sup>82</sup>

The introduction of a theoretical base into the US Army's FM 100-5 has stirred debate, controversy, and confusion. It has sparked a renewal of the development of a theoretical foundation in military studies. To retain its validity and usefulness, however, care must be given to the interpretation and application of theoretical concepts advanced by their authors. Clausewitz's center of gravity has sparked innumerable debates on its use and existence. Today we find it in our doctrine, both joint and service, yet a concensus has not been reached on its utility at all levels of war.

Clausewitz clearly intended his analogy of a center of gravity to be utilized above the tactical level of war. Tactical success of itself does not guarantee victory in war; the results of a single battle rarely determine the outcome of a campaign, much less a war. As used by Clausewitz, destruction of the enemy's center of gravity usually results in victory over the opponent. Actions at the tactical level are compressed, fast moving, and the focus is quick to change. Yet, a center of gravity is a more stable source of strength which must be neutralized or destroyed.

A center of gravity is a source of strength. It is not a vulnerability that is easily attacked and destroyed. For each center of gravity there exists vulnerable points that can be attacked, allowing the center of gravity to be indirectly destroyed or neutralized. These points--decisive points--are the focus of tactical level commanders. Through the orchestration of tactical events, the operational commander can strike the center of gravity by striking the enemy at decisive points with overwhelming combat power, giving him a decided advantage over his opponent, weakening the center of gravity and the enemy's ability to continue the fight. Decisive points are only decisive when they are linked to the center of gravity.

The 1993 edition of FM 100-5 more closely follows Clausewitz's definitions and intent for center of gravity. The sentence describing its existence at the tactical level of war should be removed and the concept retained only at the strategic and operational levels of war. Joint doctrine must also be changed to reflect the correct usage of this concept. These changes will go far in reducing the confusion of identifying a center of gravity, particularly at the tactical level where commanders often struggle to identify one, only to name a decisive point as the enemy's center of gravity.

"It is my ambition to write a book that would not be forgotten after two or three years, and that possibly might be picked up more than once by those interested in this subject."<sup>83</sup> Clausewitz's hopes and ambitions have been realized. One hundred sixty years

after the publication of On War, military forces around the world are still struggling to grasp the many thoughts and ideas he put on paper and apply them to a completely different world. Some are more successful than others in reconciling the many inconsistencies in his book, but it is a tribute to his genius that we are still applying his thoughts to our own experiences and doctrine.

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67. Robert Debs Heinl, Jr., Victory at High Tide, (Washington, DC: The Nautical & Aviation Publishing Company of America, 1981), p. 49.
68. Ibid., p. 48.
69. Ibid., pp. 46-49.
70. Appleman, p. 506.
71. Ibid., p. 511.
72. Ibid., pp. 511-513.
73. Ibid., pp. 515-540.
74. James Blackwell, Thunder in the Desert, (New York: Bantam, 1991), p. 103.
75. 24th Infantry Division (Mechanized) OPLAN DESERT STORM 91-3, 17 January 1991. XVIII Airborne Corps Commander's Intent, paragraph 1.b.(3), p. 3. (Hereafter referred to as OPLAN 91-3)
76. FM 100-5 (1993), p. 7-7.
77. OPLAN 91-3, p. 3.
78. Ibid., Annex A, Task Organization.
79. Blackwell, p. 188.
80. U. S. News & World Report, Triumph Without Victory, (New York: Times Books, 1992), p. 376.

81. Blackwell, pp. 209-210.

82. Paret, p. 193.

83. Clausewitz, p. 63.

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